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(54) Modular pushbutton board

(57) A modular electrical pushbutton board comprises a supporting body for the modules which form the pushbutton board, which is obtained from a section in which openings (11) are made for housing such modules, and which is cut to the necessary length for each specific application. The section (10) is provided with lateral (12, 13) and rear (15) longitudinal grooves for securing an upper (18) and a lower (17) end piece or block; the first is directly screwed, in a detachable way, to a box housed within a suitable cavity within a wall, the second is pivotally fastened on a third block (31) which is fixedly screwed to the wall box. By unscrewing the screw of the upper block the section (10) can rotate outwards around the lower hinge, and operations can thus be carried out of replacement, maintenance and repair of the various modules fastened inside the section.

Fig.1

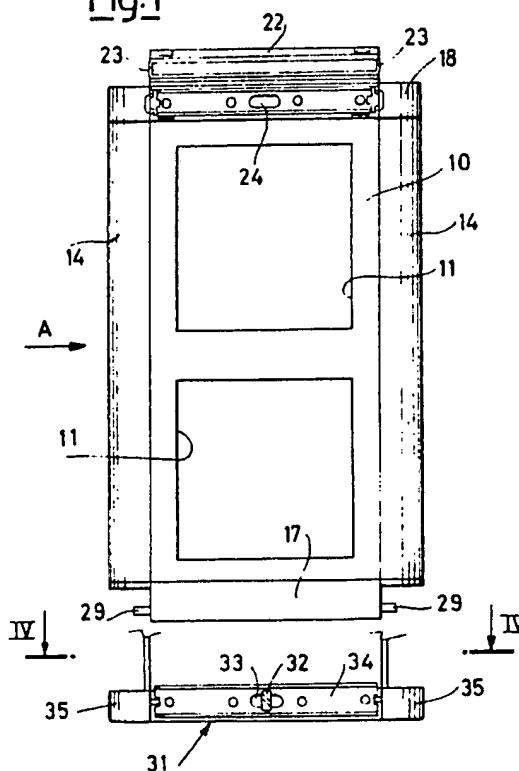
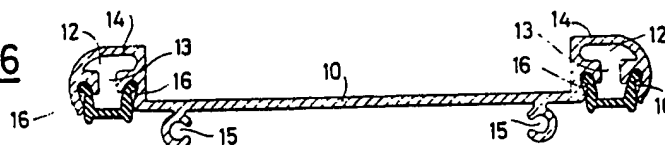


Fig.6



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Fig.1

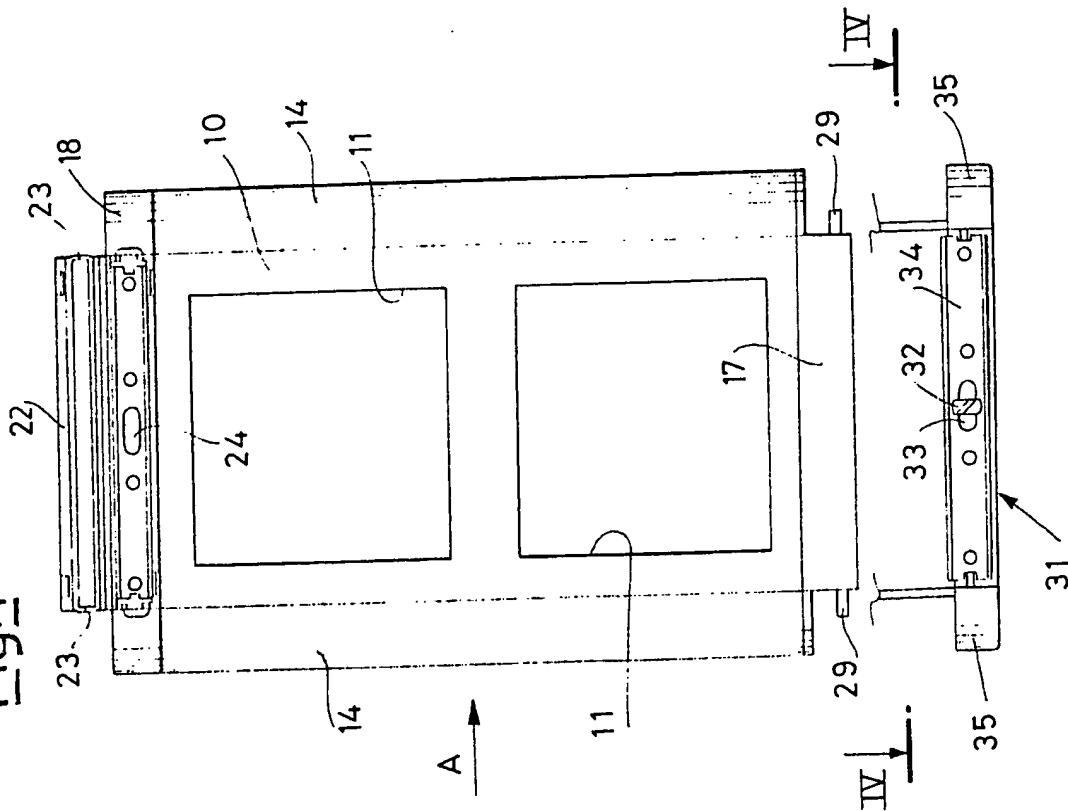
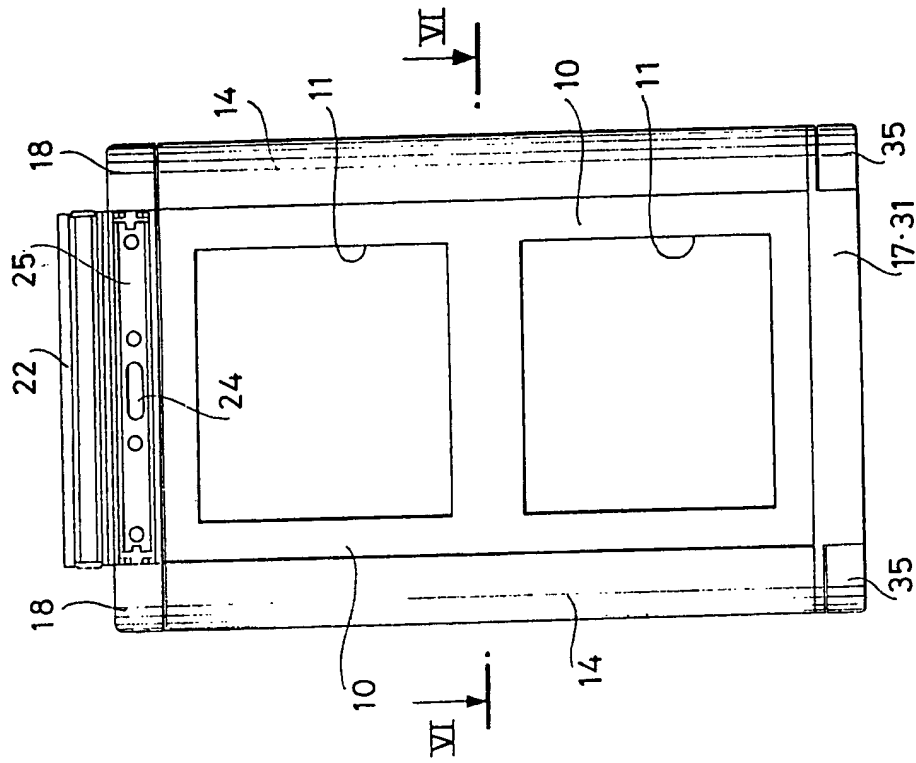
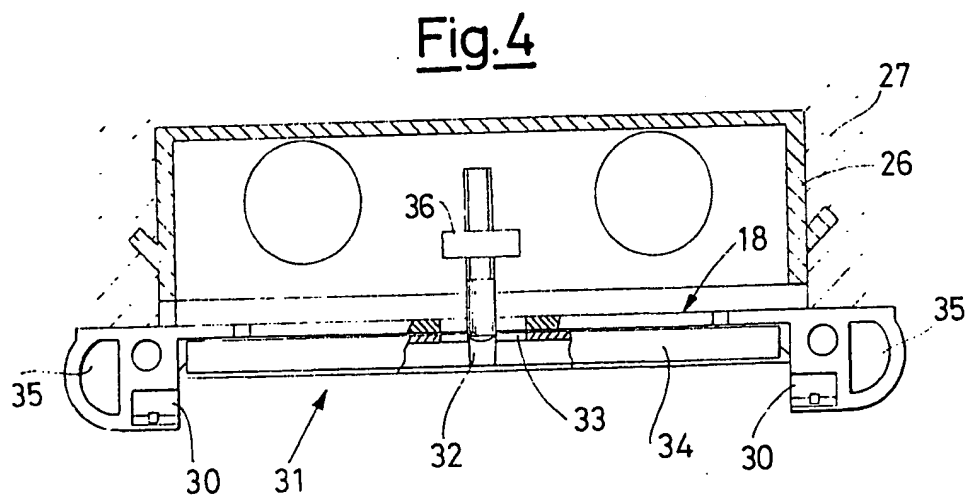
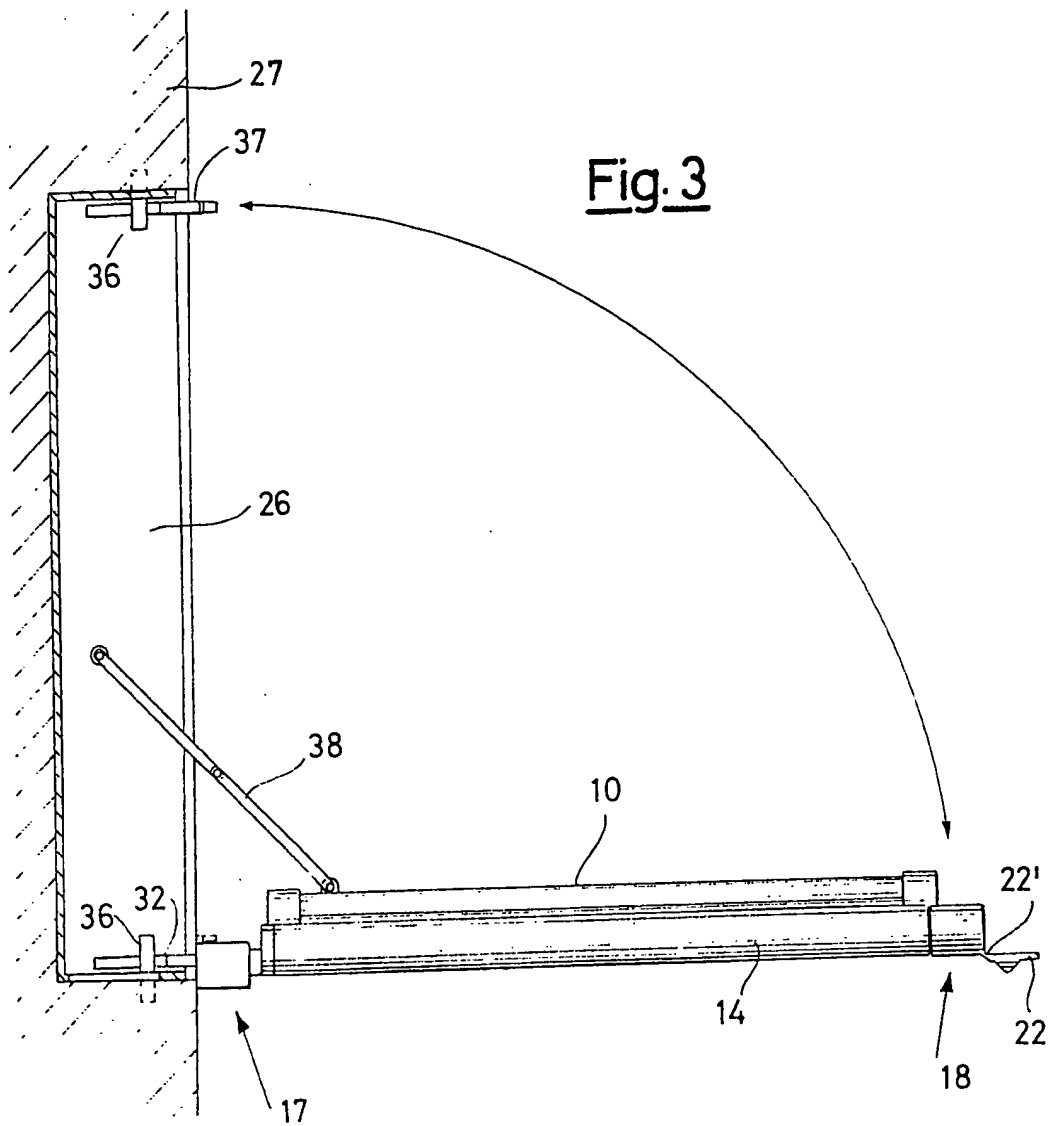
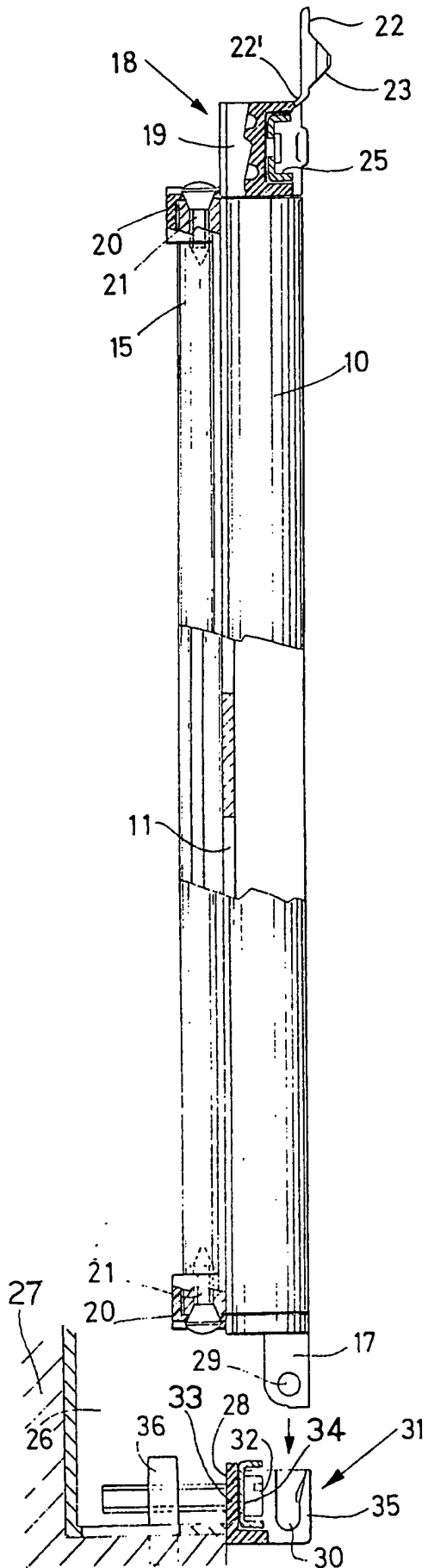
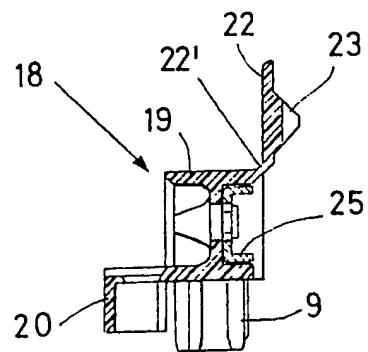
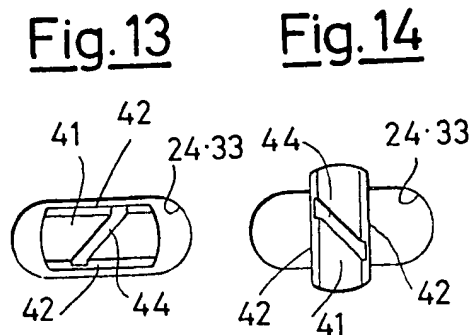
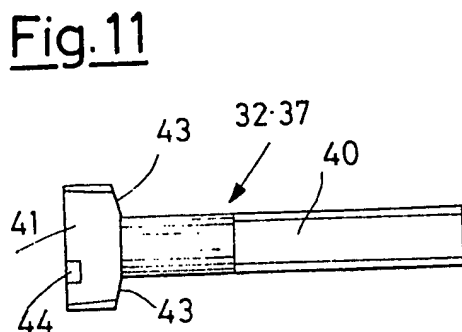
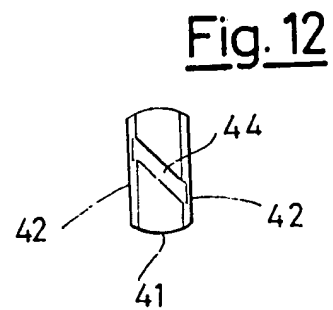
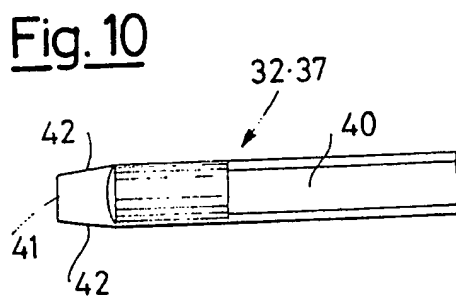
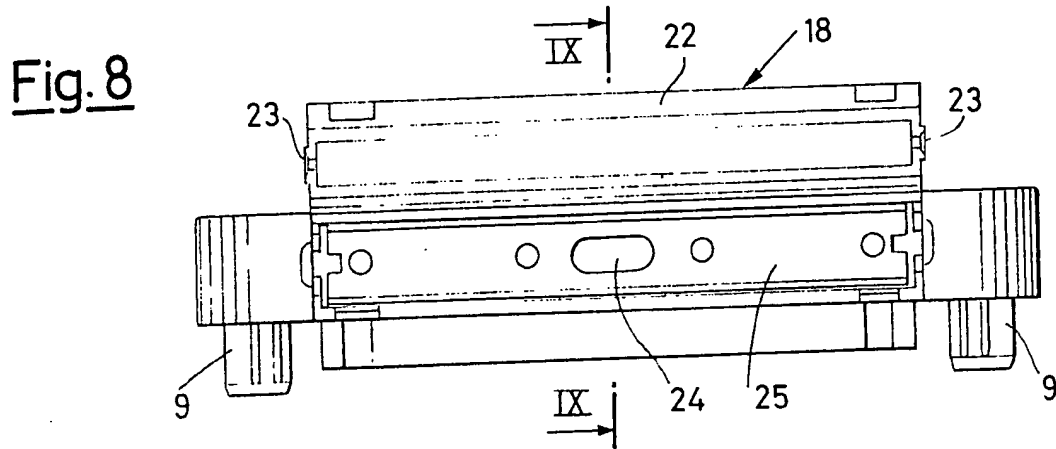
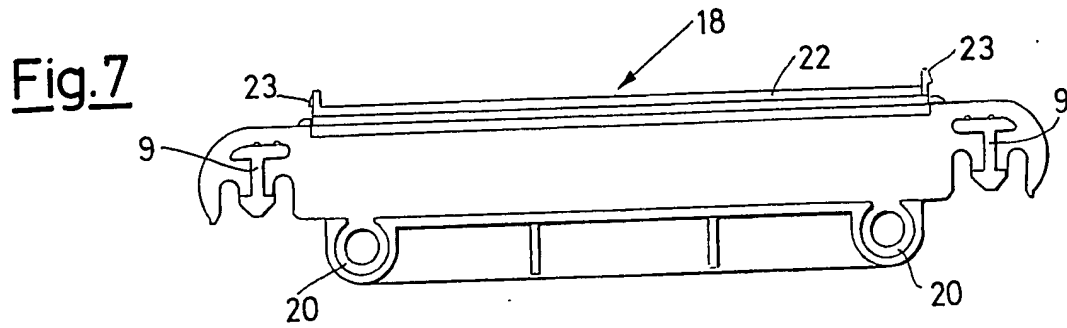
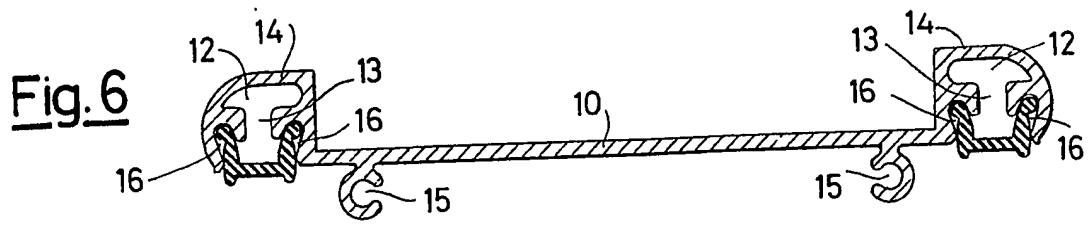


Fig.2





Fig. 5Fig. 9



SPECIFICATION

Modular pushbutton board

- 5 The instant invention relates to a modular electrical pushbutton board.

To the purpose of satisfying the request of the many types of electrical pushbutton boards used in all civil and industrial applications, such as electrical porters, videoporters, intercom exchanges, electrical and light signalling panels, panels for electrical boards, both for interior and for external use, a noticeable variety is of course necessary of supports and frames, capable of housing and fastening the components, whose types and quantities may be largely variable, required by specific applications.

As a result, a large quantity of articles of metals or of plastics, manufactured by casting, moulding and shearing, must be produced each time, and respectively held available on hand, with a heavy waste of time and space, as well as of economical resources.

The ideal solution is, in such a situation, fitting the components to a standard shape, by means of a highly flexible modularity, and, should it be not possible, with the possibility of reducing the number of different dimensions.

Another disadvantage of the presently available pushbutton boards is that, as the range of sections used for manufacturing them has now become very broad, the several elements forming these pushbutton boards must be variably cut and assembled, and components cannot be used directly outcoming from moulding; the problem therefore arises of how to finish the edges of the cut components in correspondence of the cut.

Whilst a moulded piece is indeed finished along its whole perimeter, according to the cavity of the expensive mould, for plastics as well as for metals, a section can only have two finished edges, representing the side edges, whilst the other two edges show the contour of their cross section only.

Whatever be the use of the cut profile, therefore, suitable end finishing piece—or heads—are needed, to the purpose of finishing the two cut edges, with a contour matching with the two profiled edges. In addition to their ornamental purpose, such end pieces must also act as means for fastening the surface of the board, of the plate or of the pushbutton board produced from the section, to the housing box, either of the embedded type, or of the external type.

It should moreover be considered, that presently available pushbutton boards for electrical porters are usually housed inside different types of housings, such as of the embedded and of the external type.

Such housings are provided with a cover, with a plate, mounted on hinging pivots,

suitable to be opened for surveys as well as technical maintenance interventions.

Such opening is made possible by the use of screws or of locks: the screws suffer from the disadvantage of requiring long removal times, and of being liable to be lost; the locks are expensive and space-consuming, and involve the use of a key, it too liable to be lost.

Main purpose of the instant invention is to provide a pushbutton board consisting of a plurality of components of standardized shape, which allow a very flexible modularity to be achieved, according to the type and the dimensions of the pushbutton board needed.

This purpose is achieved according to the invention by providing a pushbutton board composed by a section, cut to the needed length, and sheared to the purpose of providing the housing for the desired modules.

The section according to the invention fulfills also the task of supporting the modules, as well as of acting as a finishing frame of pleasant appearance, with its length being variable only as a function of the cutting length, and hence of the surface capable of housing the different numbers of modules.

A further purpose of the invention is to completely eliminate hinges and complex moving assemblies, still allowing a rotation of about 90 geometrical degrees to be performed of the pushbutton board, for the survey of the pushbutton board rear, for the electrical connections, or for replacement and check operations.

Another purpose of the invention is to provide particular end pieces for fastening the pushbutton board panel to the housing box, allowing an easy and quick assembling of these two elements to be obtained.

It is finally a purpose of the invention to provide the pushbutton board of the invention with a special screw for the quick clamping of the components of the pushbutton board designed as disclosed hereinabove, which, at the lowest overall dimensions, cost, and mounting and intervention time, would allow the same performances to be gained of one of the devices mentioned, with the notable advantage of remaining within its seat, and of being therefore not liable to be lost. Moreover, whilst in the traditional systems using screws, the threaded bores housing the screw must be protected against lime, cement and building materials in order not to obstruct the threaded bore and not to damage its threadings, the special screw of the present invention eliminates the disadvantages mentioned, by closing the threaded bore.

Another advantage of the screw according to the invention is that an off-centre engagement is avoided, which would damage the threadings of the screw and of the threaded bore.

To these and other purposes which shall be better understood from the following, the in-

vention provides a modular electrical pushbutton board, characterized in that it comprises a supporting body for the modules forming the pushbutton board, obtained from a section in which housing cavities are provided for said modules, and which is cut to the necessary length for each specific application; said section being moreover provided with upper and lower means for constraining it to section fastening means to a wall box embedded within a suitable cavity inside the wall; one of the fastening means being hinged to the wall box around an axis substantially parallel to the surface of the wall, and to the extension of said fastening means.

The modular pushbutton board according to the invention is now described with reference to the drawings attached, in which:

Figure 1 is a front view of the module supporting plate of a pushbutton board of the invention, while it is being inserted inside a suitable housing for it;

Figure 2 is a view similar to Fig. 1, with the supporting plate inserted within the housing;

Figure 3 is a side view of the supporting plate inserted inside the housing, but rotated outwards relatively to it;

Figure 4 is the section according to the line IV-IV of Fig. 1;

Figure 5 is a view according to the direction A of Fig. 1, partly in section;

Figure 6 is the section according to the line VI-VI of Fig. 2;

Figures 7 and 8 are respectively a plan view and a front view of an end piece for fastening the module supporting plate within a suitable housing;

Figure 8 is the section along the line IX-IX of Fig. 8;

Figures 10, 11 and 12 are respectively a side view, a plan view and a front view of a screw suitable to be used in the pushbutton board of the invention;

Figures 13 and 14 are views of the screw of Figs. 10-12 respectively during the step of its insertion, and after having been inserted inside a slot of the pushbutton board.

The section 10 according to the invention, which is the supporting plate for the modules forming the pushbutton board can be seen in Figs. 1, 2, 3, 5 and 6, and is formed by a rigid frame of metal or of plastics, in which openings 11 are provided for housing said modules. The section 10, as it can be seen from Fig. 6, has longitudinal grooves 12, 13 and 16 provided along its side edge 14, and grooves of circular cross section 15, they too being longitudinal, and provided on the rear face of the section itself.

To the upper and lower ends of section 10, respective transversal upper and lower end pieces 18 and 17 are applied.

As it can be seen in Figs. 1, 2, 3, 5, and 9, the upper end piece 18 is formed by a rigid block 19, an extremity 20 of which is slipped

inside the ends of both grooves 15 of the section, and is clamped on them by means of thread-forming self-tapping screws 21, which are screwed inside bores provided in said grooves themselves.

The block 19 is extended in such a way as to cap the section 10 from the above, being clamped to its sides by means of extensions 9 (Figs. 7, 8 and 9) which slip inside the grooves 12 and 16 of the side frame 14. In such a way, the end piece 18 is rigidly constrained to the section 10.

The block 19 is moreover provided with a flap 22 which is made as a single piece with the block, and is hinged to it in 22', which is normally kept shut by engaging several teeth 23 of its inside suitable seats in the block 18. In the block 18 is moreover provided a transverse stiffening bar 25 in which a slot 24 is provided.

The lower end piece 17 is simply a transverse bar, screwed to the section 10 exactly in the same way as the upper end piece (Fig. 5), from which pivots 29 protrude sideways, suitable to be slipped during the assembling process, inside grooves 30 of a second block 31 (see Figs. 1, 2, 4 and 5). This latter is provided with a flat rear surface 28 intended for engaging as a shoulder the wall box 26 positioned inside the suitable cavity inside the wall 27. Laterally to the block 31 two shoulders 35 protrude, which lean on the wall 27 when the block is fastened by means of a screw 32 which engages a slot 33 of a transverse stiffening bar 34 of the block 31, and is screwed in a matching bore of the wall box 26. The grooves 30 intended for coupling the section 10 to the block 31, by means of the pivots 29, are provided in these lateral shoulders 35, as it can also be observed in Fig. 4.

After having fixed the wall box 26 inside the relevant cavity of the wall 27, the block 31 is fastened to it by means of the screw 32 of the type which is described hereunder, and is shown in Figs. 10-14. The section 10 is then hinged on to the block 31 by slipping its pivots 29 inside the grooves 30.

This all is obviously done after having inserted the several modules on the section 10, and after having positioned the sealing gaskets inside its grooves 16, so as to render the pushbutton board already operational.

After having finished the assembling, the section 10 is constrained also on its upper side to the wall box 26 by means of a screw 37 which is screwed in a nut 36 provided inside the box 26; also this second screw is advantageously of the type shown in Figs. 10-14.

However, as the plate 10 is hinged in 29 to the lower block, it will be enough to unscrew the screw 37 by 90°, as it will be seen later on, to be able to turn outwards the plate 10 by about 90°, as it can be seen in Fig. 3. A

brace 38 between the box 26 and the plate 10 will prevent this latter from further rotating, allowing the operator to replace, repair and modify all the units fixed on to the section 10, which form the pushbutton board.

In addition to the practicality of assembling and of use of this modular pushbutton board, it can be observed that its length and its characteristics can be varied to fit to the various needs, without any execution problems; the end pieces 17 and 18 can indeed be applied in the same way on long sections (two or more module supporting cavities 11), as well as on short sections (on module supporting cavity), as the grooves 12, 13, 14, 15 and 16 are provided along the whole length of the section 10, which can therefore be cut to the desired length, to fit to the wall box 26 into which it has to be inserted, without any problems concerning the fitting to the related blocks 17 and 18.

The screw 32 or 37 may have the shape shown in Figs. 10 to 14, i.e., it may consist of a shank 40 partly threaded and of a head 41 with inclined sides 42 and rear planes 43, which too are inclined to the purpose of promoting the thrust on the edges of the slot 24 or respectively 33 of the relevant blocks.

Also a diagonal slot 44 allows the length to be increased of the walls reacting to the force applied by the screwdriver.

Moreover, the particular shape of the screw head 41, as it can be seen in Figs. 13 and 14, is such that to the purpose of disengaging the slot 24, 33, it is enough that the screw be unscrewed by 90° (Fig. 13) relatively to the locking position (Fig. 14) and then, in the first case (screw 37, slot 24 of Fig. 3) the section 10 can be turned by 90° outwards around the lower hinging means 29, in the second case (screw 32, slot 33 of Figs. 1, 4 and 5) the block 31 can be disengaged from the wall box 26.

45 CLAIMS

1. Modular electrical pushbutton board characterized in that it comprises a body (10) for supporting the modules which form the pushbutton board, made from a section in which cavities (11) are provided for housing said modules, and which is cut to the necessary length for each specific application; said section being moreover provided with constraining upper and lower means (14, 15) for constraining such section to fastening elements (17, 18) of the section (10) to a wall box (26) embedded inside a suitable cavity of the wall (27); one of the fastening elements being pivotally connected to the wall box (26) around an axis (29) substantially parallel to the surface of the wall, and to the extension of said element.

2. Pushbutton board as claimed in claim 1, characterized in that the constraining means (14, 15) to said fastening elements

(17, 18) consist of respectively lateral (12, 13) and rear (15) grooves, all of them being provided along the whole length of the section (10) on to which extensions are embedded and constrained of said fastening elements (17, 18), and along which sealing gaskets of the section are applied.

3. Pushbutton board as claimed in claims 1 and 2, characterized in that the upper fastening element (18) is a block which extends through the whole width of the section, and is provided with a longitudinal flap (22) section, and it provided with a longitudinal flap (22) made as only one piece with the block to which it is hinged (22'), which hides, when it is closed, a slot (24) in which a locking screw (37) is screwed, for locking the block (18) to the wall box (26).

4. Pushbutton board as claimed in claims 1 and 2, characterized in that the lower fastening element (17) is a block which extends through the whole width of the section and is provided with lateral pivots (29), which are rotatably snap embedded inside suitable seats (30) of a third block (31) provided with slot (33) in which a screw (32) is screwed to the purpose of locking it to the wall box (26) and against the wall (27), against which two lateral shoulders (35) of it, inside which said grooves (30) are provided, are made to lean.

5. Pushbutton board as claimed in claims 1, 3 and 4 characterized in that the screws (32, 37) have a square head (41) with at least two opposed sides of length lower than the dimension of two opposed sides of the slot (24, 39) to allow the element (17, 18) provided with suitable slot to be removed without needing removing the screw.

6. Pushbutton board as claimed in claim 5, characterized in that the head (41) of the screw has its front slot (44) positioned obliquely, and bevels (43) on its rear surface.

7. Pushbutton board as claimed in claim 1, characterized in that between the section (10) and the wall box (36) a brace is applied, which limits the rotation of the section at not more than 90° relatively to the box itself.